All India Test Series (2023-24)

Test Code: ANY/12

AITS TEST - 12

YAKEEN NEET

DURATION: 200 Minutes | **DATE: 27/04/2024** | **M. MARKS: 720**

Topics Covered

Physics:	Full Syllabus.
Chemistry:	Full Syllabus.
Botany:	Full Syllabus.
Zoology:	Full Syllabus.

General Instructions:

1. Immediately fill in the particulars on this page of the test booklet.
2. The test is of **3 hours 20 minutes** duration and the Test Booklet contains **200** multiple choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** questions in each subject are divided into **two sections (A and B)** as per details given below:
   (a) **Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos. – 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All Questions are compulsory.
   (b) **Section B** shall consist of **15 (Fifteen)** questions in each subject (Question Nos. – 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject.
   Candidates are advised to read all 15 questions in each subject of Section-B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, **the first ten questions answered by the candidate shall be evaluated.**
3. There is only one correct response for each question.
4. Each **correct** answer will give **4 Mark** while **1 Mark** will be **deducted** for a **wrong** answer. The maximum marks are 720.
5. No student is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. inside the examination room/hall.
6. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.

OMR Instructions:

1. Use blue/black dark ballpoint pen.
2. Darken the bubbles completely. Don't put a tick mark or a cross mark where it is specified that you fill the bubbles completely. Half-filled or over-filled bubbles will not be read by the software.
3. Never use pencils to mark your answers.
4. Never use whiteners to rectify filling errors as they may disrupt the scanning and evaluation process.
5. Writing on the OMR Sheet is permitted on the specified area only and even small marks other than the specified area may create problems during the evaluation.
6. Multiple markings will be treated as invalid responses.
7. **Do not fold or make any stray mark on the Answer Sheet (OMR).**

Name of the Student (In CAPITALS): _____

Roll Number: _____

OMR Bar Code Number: _____

Student's Signature: _____ Invigilator's Signature _____

(PHYSICS)

SECTION-A

1. Two points A and B are 2 cm apart and a uniform electric field $\vec{E}$ act along the straight-line AB directed from A to B with E = 300 N /C. A particle with charge $+10^{-6}$ C is taken from A to B along AB. The potential difference $V_A - V_B$ is;

(1) 3 V (2) –3 V
(3) 6 V (4) – 6 V

2. A particle starts rotating from rest about a fixed axis according to the formula: $\theta = \frac{3t^4}{8} - \frac{t^2}{2}$ radians. The angular acceleration of the particle at the end of 2 seconds is;

(1) 10 rad/s^2 (2) 12 rad/s^2
(3) 16 rad/s^2 (4) 17 rad/s^2

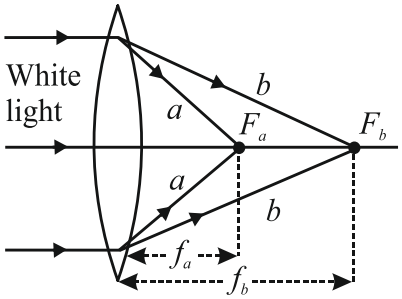
3. Identify the **INCORRECT** statement.

(1) Hole is a missing electron in the valence band.
(2) Hole acts as positive charge carrier.
(3) The mobility of hole is less than that of an electron.
(4) Hole acts as a real charge.

4. A sample of O_2 is at a pressure of 1 atm when the volume is 100 ml and its temperature is 27°C. What will be the temperature of the gas if the pressure becomes 3 atm and volume remains 100 ml?

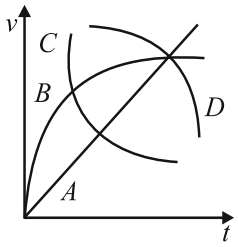
(1) 27°C (2) 327°C
(3) 627°C (4) 900°C

5. White light is incident on a convex lens as shown in figure. After refraction from the lens, a and b represent the colors present in white light. If f_a and f_b represent the focal length of colors a and b respectively, then which of the following is the **correct** option?



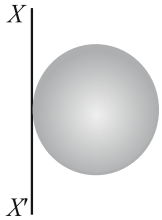
(1) a is red light and b is violet light
(2) a is violet light and b is red light
(3) a is red light and b is blue light
(4) a is yellow light and b is green light

6. A spherical ball is dropped in a long column of a highly viscous liquid. Identify the **correct** graph representing the speed of the ball (v) as a function of time (t).



(1) B (2) C
(3) D (4) A

7. The radius of gyration of a solid sphere of mass M and radius $2R$ rotating about an axis XX' as shown in figure is;



(1) $\sqrt{\frac{28}{5}}R$ (2) $\sqrt{\frac{14}{5}}R$
(3) $\sqrt{\frac{7}{5}}R$ (4) $\sqrt{\frac{3}{5}}R$

8. A body of mass 3 kg makes an elastic collision with another body at rest and continues to move in the original direction with one sixth of its original speed. The mass of the second body is;

(1) $\frac{13}{7}$kg (2) $\frac{15}{7}$kg
(3) $\frac{16}{7}$kg (4) $\frac{19}{7}$kg

9. A straight long solenoid produces magnetic field 'B' at its center. If it is cut into three equal parts and the same number of turns are wound on one part, then the magnetic field produced by new solenoid at its center is;

(1) B (2) $3B$
(3) $\frac{B}{3}$ (4) $9B$

10. If h is the Planck's constant, then the angular momentum of electron in 4th orbit of He^+ ion is;

(1) $\frac{h}{\pi}$ (2) $\frac{h}{2\pi}$
(3) $\frac{2h}{\pi}$ (4) $\frac{3h}{2\pi}$

11. A fish is at the depth of 30 cm below the surface of a liquid. If the distance between the fish and its image as seen by an observer in air is 7.5 cm, then the refractive index of the liquid is;

(1) $\frac{3}{4}$ (2) $\frac{3}{5}$

(3) $\frac{4}{3}$ (4) $\frac{4}{5}$

12. If a soap bubble expands, then the pressure inside the bubble;

(1) increases
(2) remains the same
(3) is equal to the atmospheric pressure
(4) decreases

13. Which of the following physical quantities has same dimensions as strain?

(1) Refractive index
(2) Momentum
(3) Pressure
(4) Planck's constant

14. For an EM wave travelling in vacuum, if the maximum value of magnetic field at a distance 2.5 m from the source is 2.09×10^{-7} T, then the maximum value of electric field at the same distance will be;

(1) 0.627 V/m
(2) 6.27 V/m
(3) 62.7 V/m
(4) 67.2 V/m

15. A constant voltage is applied across a wire of constant length and the drift velocity of electrons in the wire is found to be v_d. Keeping the length constant if the area of cross section of the wire is now doubled, and the same voltage is applied across the new wire, then the drift velocity will be;

(1) v_d (2) $2v_d$

(3) $0.5v_d$ (4) $4v_d$

16. An α-particle moves in a circular path of radius 4.125 cm in the presence of a magnetic field of 0.5 Wb/m^2. The de Broglie wavelength associated with the particle is; (Use $h = 6.6 \times 10^{-34}$ Js)

(1) 0.01 Å
(2) 0.001 Å
(3) 0.02 Å
(4) 0.002 Å

17. A rectangular loop of area 0.04 m^2 is placed in a magnetic field 1.5 T with its plane inclined at an angle of 30° to the field direction. The flux linked with plane of loop is;

(1) 0.03 Wb
(2) 0.05 Wb
(3) 0.3 Wb
(4) 0.5 Wb

18. The dimensions $[M^{-1}L^{-3}T^4A^2]$ belong to;

(1) self-inductance
(2) magnetic permeability
(3) permittivity of free space
(4) magnetic flux

19. The photoelectric work-function of potassium is 2.3 eV. If the kinetic energy of the most energetic electrons ejected is 2.1 eV, then the wavelength of incident light is approximately; (Take hc = 12375 eVÅ)

(1) 1800 Å
(2) 2800 Å
(3) 3900 Å
(4) 4600 Å

20. In half-wave rectification, if the input frequency is 50 Hz then the output frequency is also 50 Hz? What is the output frequency of a full-wave rectifier for the same input frequency?

(1) 25 Hz (2) 50 Hz

(3) 100 Hz (4) 200 Hz

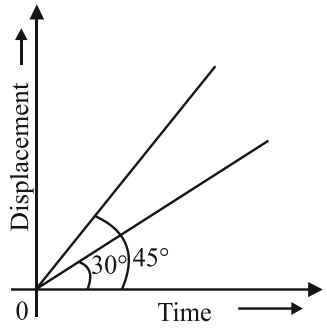
21. Starting with the same initial conditions, an ideal gas expands from volume V_1 to V_2 in three different ways. If the work done by the gas is W_1 when the process is purely isothermal, W_2 when purely isobaric and W_3 when purely adiabatic, then;

(1) $W_2 > W_1 > W_3$
(2) $W_2 > W_3 > W_1$
(3) $W_1 > W_2 > W_3$
(4) $W_1 > W_3 > W_2$

22. The decreasing order of wavelength of infrared, microwave, ultraviolet and gamma rays is;

(1) microwave, infrared, ultraviolet, gamma rays
(2) gamma rays, ultraviolet, infrared, microwaves
(3) microwaves, gamma rays, infrared, ultraviolet
(4) infrared, microwave, ultraviolet, gamma rays

23. The displacement-time graphs of two moving particles make angles of 30° and 45° with the *x*-axis as shown in the figure. The ratio of their respective velocities is;



(1) 1 : 1 (2) 1 : 2

(3) $1:\sqrt{3}$ (4) $\sqrt{3}:2$

24. Maximum intensity in YDSE is I_0. The intensity at a point on the screen where the path difference between the two interfering beams is $\frac{\lambda}{3}$ will be;

(1) $\frac{I_0}{3}$ (2) $\frac{I_0}{4}$

(3) $3I_0$ (4) I_0

25. The peak voltage of an A.C. source is equal to;

(1) the rms value of the ac source.

(2) $\sqrt{2}$ times the rms value of the ac source.

(3) $\frac{1}{\sqrt{2}}$ time the rms value of the ac source.

(4) the value of the voltage supplied to the circuit at all instants.

26. If the tension in a stretched string is reduced to half, then the ratio of the initial and final speeds of a transverse wave along the string is;

(1) 1 : 2

(2) 2 : 1

(3) $\sqrt{2}:1$

(4) $1:\sqrt{2}$

27. **Statement I:** The kinetic energy of charged particles moving in a uniform magnetic field does not change.

Statement II: Work done by magnetic force on the charge is zero.

(1) Both Statement I and Statement II are correct.

(2) Both Statement I and Statement II is incorrect.

(3) Statement I is correct and Statement II is incorrect.

(4) Statement I is incorrect and Statement II is correct.

28. The resistance of a thin silver wire is 1.0 Ω at a reference temperature of 20°C. The wire is placed in a liquid bath and its resistance rises to 1.2 Ω. What is the approximate temperature of the bath? (Temperature coefficient of resistance for silver is 3.8×10^{-3}/°C)

(1) 29°C (2) 56.9°C

(3) 64.6°C (4) 72.6°C

29. The energy that will be ideally radiated by a 10 kW transmitter in 2 hours is;

(1) 36×10^5 J

(2) 36×10^6 J

(3) 72×10^5 J

(4) 72×10^6 J

30. A body of mass 100 g experiences a gravitational force of 5.0 N when placed at a particular point. The magnitude of the gravitational field intensity at that point is;

(1) 0.5 N/kg

(2) 5 N/kg

(3) 50 N/kg

(4) 500 N/kg

31. The mass defect of a nuclei in a nuclear fusion reaction is 0.4%. What amount of energy will be liberated when one kg of nuclei is used for fusion?

(1) 3.2×10^{14} J

(2) 3.2×10^{16} J

(3) 3.6×10^{14} J

(4) 3.6×10^{16} J

32. A uniform electric field along positive *x*-direction exists in a region. Let *A* be the origin, *B* be the point on the *x*-axis at $x = +2$ cm and *C* be the point on the *y*-axis at $y = +2$ cm. Then, the potentials at the points *A*, *B* and *C* satisfy;

(1) $V_A = V_B$ and $V_A > V_C$

(2) $V_A = V_C$ and $V_A > V_B$

(3) $V_A = V_B$ and $V_C > V_A$

(4) $V_A = V_C$ and $V_B > V_A$

33. A copper wire of length 10 m and radius $\left(\frac{10^{-2}}{\sqrt{\pi}}\right)$ m has electrical resistance of 10 Ω. The current density in the wire for an electric field strength of 10 V/m is;

(1) 10^6 A/m^2

(2) 10^{-5} A/m^2

(3) 10^5 A/m^2

(4) 10^4 A/m^2

34. A pebble is thrown vertically upwards from a bridge with an initial speed of 5 m/s. The height of the bridge is 10 m. If acceleration due to gravity is 10 m/s^2, then with what velocity does the pebble strike the ground?

(1) 5 m/s (2) 10 m/s

(3) 15 m/s (4) 25 m/s

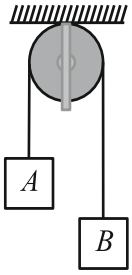
35. An electric lift with a maximum load of 2500 kg (lift + passengers) is moving up with a constant speed of 0.5 ms^{-1}. The frictional force opposing the motion is 3500 N. Considering the lift to be 100% efficient, the power delivered by the motor to the lift when the lift is going up fully loaded is; (Take g = 10 ms^{-2})

(1) 3000 W (2) 30000 W

(3) 28500 W (4) 14250 W

SECTION-B

36. In the arrangement shown in figure, m_A = 3 kg and m_B = 2 kg. Strings are light and inextensible. The acceleration of center of mass of both the blocks is; (g is the acceleration due to gravity and neglect friction everywhere.)



(1) $\frac{g}{5}$ downwards (2) $\frac{g}{5}$ upwards

(3) $\frac{g}{25}$ downwards (4) $\frac{g}{25}$ upwards

37. The length, breadth and thickness of a metal sheet are 5.234 m, 1.002 m and 2.05 cm respectively. The volume of the sheet upto correct number of significant figures is;

(1) 0.108 m^3

(2) 0.107 m^3

(3) 0.1075 m^3

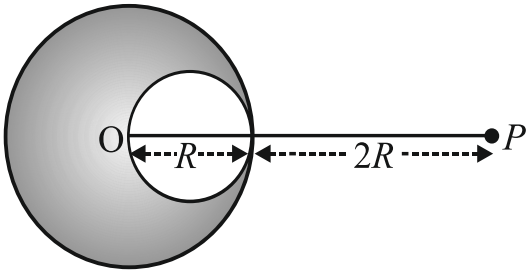
(4) 0.1085 m^3

38. Two insulated conductors are charged by transferring electrons from one conductor to another. A potential difference of 200 V is produced by transferring 12.5 × 10^{15} electrons from one conductor to the other. The capacity of the system will be;

(1) 0.1 μF (2) 1 μF

(3) 10 μF (4) 100 μF

39. A solid sphere of uniform density and radius R exerts a gravitational force of attraction F_1 on a particle P. A spherical cavity of radius $\frac{R}{2}$ is now formed in the sphere as shown in figure. The sphere with cavity now applies a gravitational force F_2 on the same particle P. The ratio of F_1 to F_2 is;



(1) 50 : 41 (2) 41 : 50

(3) 48 : 59 (4) 59 : 48

40. A simple pendulum is suspended from the ceiling of a lift. When the lift is at rest, its time period is T. With what acceleration should lift be accelerated upwards in order to reduce its time period to $\frac{2T}{3}$?

(g is the acceleration due to gravity)

(1) $\frac{2g}{3}$ (2) $\frac{3g}{2}$

(3) $\frac{5g}{4}$ (4) $\frac{4g}{5}$

41. **Assertion:** Young's modulus for a perfectly plastic body is zero.

Reason: For a perfectly plastic body, restoring force is zero.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true, but **Reason (R)** is false.

(4) Both **Assertion (A)** and **Reason (R)** is false.

42. A ball is projected with a velocity 20 ms^{-1} at an angle of 60° with the vertical direction. Its speed at the highest point of the trajectory will be;

(1) 20 ms^{-1}

(2) 10 ms^{-1}

(3) $5\sqrt{3}$ ms^{-1}

(4) $10\sqrt{3}$ ms^{-1}

43. Two transparent media A and B are separated by a plane boundary. The speed of light in those media are 1.5×10^8 m/s and 2.0×10^8 m/s respectively. The critical angle for these two media is;

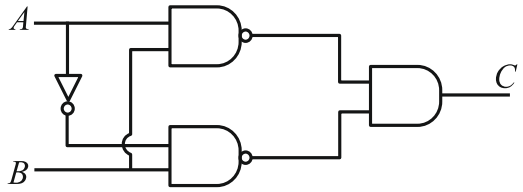
(1) $\sin^{-1}(0.750)$

(2) $\tan^{-1}(0.500)$

(3) $\tan^{-1}(0.750)$

(4) $\sin^{-1}(0.500)$

44. For the given logic circuit, identify the **correct** option.



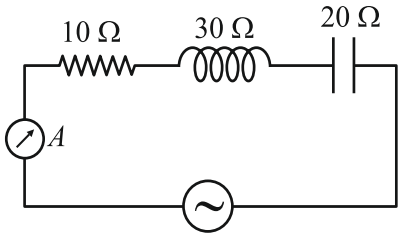
(1) $A = 0$, $B = 0$ and $C = 0$

(2) $A = 0$, $B = 1$ and $C = 1$

(3) $A = 1$, $B = 0$ and $C = 0$

(4) $A = 1$, $B = 1$ and $C = 0$

45. For the given series LCR AC circuit, the potential differences across resistor and capacitor are respectively;



$E = 100 \sin 100\,\pi t$ volt

(1) 50 V and 50 V

(2) 50 V and 100 V

(3) $\frac{100}{\sqrt{2}}$ V and $\frac{200}{\sqrt{2}}$ V

(4) $\frac{200}{\sqrt{2}}$ V and $\frac{100}{\sqrt{2}}$ V

46. A resistance of 2 Ω is connected across one gap of a meter bridge (the length of the wire is 100 cm) and an unknown resistance, greater than 2Ω, is connected across the other gap. When these resistances are interchanged, the balance point shifts by 20 cm. Neglecting any corrections, the unknown resistance is;

(1) 3 Ω (2) 4 Ω

(3) 5 Ω (4) 6 Ω

47. A closed curve encircles several conductors. The line integral $\oint \vec{B}.\overrightarrow{d\ell}$ around this curve is 7.66×10^{-7} Tm. What is the net current in the conductors approximately? (Take $\pi = 3.14$)

(1) 0.6 A

(2) 0.5 A

(3) 0.3 A

(4) 0.2 A

48. The magnetic flux passing through a metal ring varies with time t as: $\phi_B = 2(bt^2 - at^3)$ Tm^2 with $a = 2.00$ and $b = 6.00$ in SI units. The resistance of the ring is 2.0 Ω. The maximum current induced in the ring during the interval from t = 0 to t = 2.0 s is;

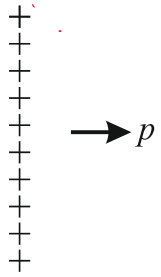
(1) 6 A

(2) 4 A

(3) 3 A

(4) 2 A

49. An electric dipole is placed perpendicular to infinite line charge at some distance as shown in figure. Identify the **correct** statement.



(1) The dipole is repelled from the line charge.

(2) The dipole is attracted by the line charge.

(3) The dipole does not experience a force.

(4) The dipole experiences a force as well as a torque.

50. A nucleus of mass number 152 splits into two nuclei having mass number 125 and 27. The ratio of radius of two daughter nuclei is;

(1) 5 : 2

(2) 5 : 3

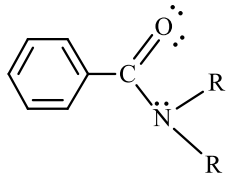
(3) 3 : 4

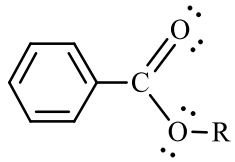
(4) 3 : 2

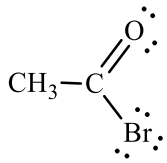
(CHEMISTRY)

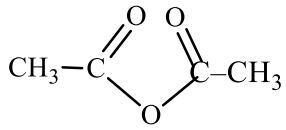
SECTION-A

51. Least partial positive charge is present on which carbonyl carbon?

(1) 

(2) 

(3) 

(4) 

52. Match the **List-I** with **List-II** and choose the **correct** option.

List-I		List-II	
(A)	Chromyl chloride test	(I)	S^{2-}
(B)	Ring test	(II)	NO_3^-
(C)	Smell of vinegar	(III)	CH_3COO^-
(D)	Smell of rotten eggs	(IV)	Cl^-

(1) A-IV, B- II, C- III, D-I
(2) A-IV, B- II, C- I, D-II
(3) A-III, B- II, C-I, D-IV
(4) A-I, B- IV, C- II, D-III

53. Colour of $CuSO_4.5H_2O$ is;
(1) Blue (2) Green
(3) Yellow (4) White

54. What is the electronic configuration for a gas phase +3 ion of iron (Z = 26)?
(1) [Ar] $3d^5$ (2) [Ar] $4s^2 3d^3$
(3) [Ar] $4s^1 3d^4$ (4) [Ar] $4s^2 3d^6$

55. In this sequence of reactions, (Y) is;

$$\text{Ethanol} \xrightarrow{\text{Red P} + I_2} (X) \xrightarrow[\text{(ii) HBr}]{\text{(i) KOH(alc.)}} (Y)$$

(1) Ethene (2) Bromoethane
(3) Ethanol (4) None of these

56. In an atom, the total number of electrons having quantum numbers:

n = 4, $m_l = \pm 1$ and $m_s = -\frac{1}{2}$ is;

(1) 4 (2) 6
(3) 8 (4) 2

57. Which of the following statements is **incorrect** for the dipole moment measurement of the compound?
(1) It helps to predict the percentage ionic character in a bond.
(2) It helps to predict the shape of the molecule.
(3) It helps to predict that the particular isomer is trans isomers.
(4) It helps to predict the bond energies of all bonds within the molecule.

58. White phosphorus has;
(1) 6 P–P single bonds
(2) 4 P–P single bonds
(3) 8 lone pairs of electrons
(4) 6 P–P–P angle of 60º

59. PCl_3 reacts with water and forms acid of phosphorous. The basicity of acid of phosphorous formed is;
(1) 4 (2) 3
(3) 2 (4) 1

60. The partial hydrolysis of XeF_6 gives oxyfluoride of Xe. The change in oxidation number of Xe in the resulting oxyfluoride is;
(1) 0 (2) 4
(3) 6 (4) 2

61. Read the following statements carefully.
(I) 0.01M Na_2SO_4(aq) solution has higher boiling point than 0.01M KCl (aq) solution.
(II) 0.1M $MgCl_{2(aq)}$ solution has lower freezing point than 0.01M $NaCl_{(aq)}$ solution.
Which of the following statement is/are **correct**?
(1) Both (I) and (II) (2) Only (I)
(3) Only (II) (4) Neither (I) nor (II)

62. For the complete combustion of 280 kg C_4H_8, required amount of O_2(g) is;
(1) 480 kg
(2) 960 kg
(3) 240 kg
(4) 720 kg

63. **Assertion (A):** Half life time ($t_{1/2}$) for first order reaction is independent of temperature.

Reason (R): On increasing temperature, rate of reaction and rate constant (k) increase.

(1) Both **Assertion (A)** and **Reason (R)** are the true, and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are the true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true, and **Reason (R)** is false.

(4) **Assertion (A)** is false, and **Reason (R)** is true.

64. pH of 0.01 M aq. NaCl solution at 25ºC will be;

(1) 2 (2) 12

(3) 7 (4) 10

65. Which among the following molecules have sp^3d hybridisation with one lone pair of electrons on the central atom?

(I) SF_4

(II) XeO_2F_2

(III) $ClOF_3$

(1) (I) and (II) only

(2) (I), (II) and (III)

(3) (I) and (III) only

(4) (II) and (III) only

66. In the given redox reaction, how many H_2O molecules are produced per molecule of $Cl_{2(g)}$?

$$OH^- + Cl_2 \rightarrow Cl^- + ClO_3^- + H_2O$$

(1) 6 (2) 3

(3) 1 (4) 12

67. The number of Faraday required to generate one g–atom of Mg from fused $MgCl_2$ is;

(1) 1

(2) 2

(3) $\frac{96500}{24}$

(4) $\frac{96500}{12}$

68. For which of the following reactions, the temperature coefficient (μ) is maximum?

(1) $A \rightarrow B$, E_a = 50 kJ

(2) $C \rightarrow D$, E_a = 40 kJ

(3) $X \rightarrow Y$, E_a = 60 kJ

(4) $W \rightarrow Z$, E_a = 80 kJ

69. The oxidation potential of Hydrogen electrode dipped in a solution of pH = 4 at 25º C and P_{H_2} = 1 atm would be;

(1) 0.014 V (2) 0.236 V

(3) 0.029 V (4) 0.118 V

70. The rate constant for a first order reaction whose reaction rate is 0.06M sec^{-1} at 10 minutes and 0.02 M sec^{-1} at 20 minutes will be nearly;

(Given: log3 = 0.4771)

(1) 1.83×10^{-3} sec^{-1}

(2) 2.45×10^{-3} sec^{-1}

(3) 3.42×10^{-2} sec^{-1}

(4) 1.45×10^{-2} sec^{-1}

71. Which of the following statement is **incorrect**?

(1) N_2 is more stable than N_2^-

(2) Bond order of $O_2^+ > O_2$

(3) Bond order of O_2^+ is equal to N_2^+

(4) Bond order of O_2^{2-} is three

72. Which of the following lanthanide ion has seven unpaired electron?

(1) La^{2+} (2) Ce^{4+}

(3) Lu^{3+} (4) Gd^{3+}

73. If the electron gain enthalpy (in kJ mol^{-1}) of three halogen, X, Y and Z are respectively –350, –332 and –324. Then X, Y and Z are respectively;

(1) Cl, Br and F (2) Br, Cl and F

(3) Cl, F and Br (4) F, Cl and Br

74. Which of the following order of size is **incorrect**?

(1) $O^{2-} > F^- > Na^+$

(2) $Fe \simeq Co \simeq Ni$

(3) B < Al < Ga

(4) Sc < Y < La

75. For the reaction sequence the **correct** statement is;

$$C_2H_2(g) \xrightarrow[\text{873 K}]{\text{red hot iron tube}} (A) \xrightarrow[AlCl_3]{CH_3-\overset{\overset{O}{\|}}{C}-Cl} (B)$$

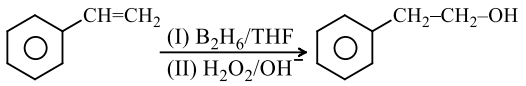
(1) B does not gives yellow ppt with I_2 and NaOH

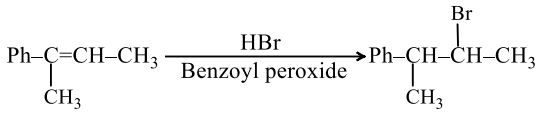
(2) Product B gives silver mirror with Tollen's reagent

(3) B is an aldehyde

(4) B reacts with 2,4–DNP

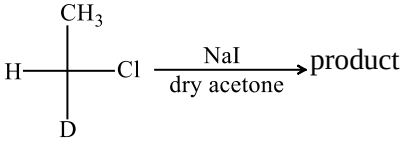
76. Which of the following reaction product is **incorrect**?

(1) 

(2) 

(3) $Ph–CH=CH_2 \xrightarrow[273\ K]{dil.KMnO_4} Ph–\underset{OH}{CH}–\underset{OH}{CH_2}$

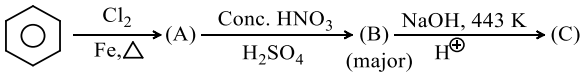
(4) $CH_3–CH=CH_2 \xrightarrow{Cl_2 + H_2O} CH_3–\underset{Cl}{CH}–\underset{OH}{CH_2}$

77. The reaction  product

the above reaction is known as;

(1) Finkelstein reaction
(2) Sandmeyer's reaction
(3) Swart's reaction
(4) Gattermann reaction

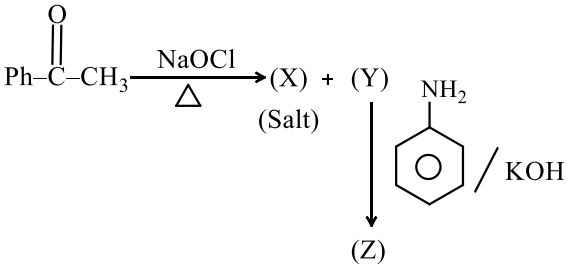
78. For the reaction sequence;



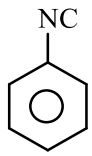
The product (C) is;

(1) Phenol
(2) Nitro benzene
(3) p-Nitrophenol
(4) Benzoic acid

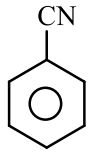
79. For the reaction

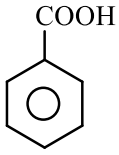


Product (Z) is;

(1) 

(2) $CHCl_3$

(3) 

(4) 

80. If a sparingly soluble salt AB_2 (Molar mass = 100 g/mol) has solubility 1 mg/L, then its solubility product (Ksp) will be;

(1) $10^{-15}\ M^3$
(2) $4 \times 10^{-5}\ M^3$
(3) $10^{-6}\ M^3$
(4) $4 \times 10^{-15}\ M^3$

81. **Correct** order of acidic strength of the following acids will be;

(I) HCOOH
(II) $NC–CH_2–COOH$
(III) Ph–COOH
(IV) CH_3COOH

(1) I > II > III > IV (2) IV > III > II > I
(3) II > I > III > IV (4) III > II > I > IV

82. Which of the following is **incorrectly** matched for H–atom?

(1) Angular momentum in 4^{th} orbit = $\frac{h}{2\pi}$
(2) $r_1 = 0.529 \times 10^{-8}$ m
(3) $v_2 = 1.09 \times 10^6$ cm/s
(4) All of these

83. Which one of the following does **not correctly** represent the **correct** order of the property indicated against it?

(1) Ti < V < Cr < Mn: Increasing number of oxidation state.
(2) $Ti^{+3} < V^{+3} < Cr^{+3} < Mn^{+3}$: Increasing magnetic moment.
(3) Ti < V < Cr < Mn: Increasing melting point.
(4) Co < Cr < Fe < Mn: stability of +2 oxidation state.

84. Hydrogen bonding is absent in;

(1) H_2O (2) HCl
(3) NH_3 (4) HF

85. **Assertion (A):** Alcohols are soluble in water.
Reason(R): The solubility results from the hydrogen bonding between the OH group of alcohols and water molecules.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

SECTION-B

86. The following reaction attain equilibrium at high temperature

$N_2(g) + 2H_2O(g) \rightleftharpoons 2NO(g) + 2H_2(g)$ ΔH = +ve.

The concentration of NO(g) at equilibrium can be affected by;

(1) Increasing the nitrogen concentration
(2) Compressing the reaction mixture
(3) Decreasing the hydrogen concentration
(4) All of these

87. **Statement I:** K_W of water decreases with increase in temperature.

Statement II: Conjugate acid of NH_3 is NH_4^+.

(1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

88. Which of the following reaction is suitable method for the preparation of primary amine?

(1) Hydrogenation of isocyanide
(2) Action of ammonia an alkyl halides
(3) Gabriel's phthalimide synthesis
(4) Darzan process

89. **Statement I:** Ethanol gives iodoform test.
Statement II: Acetic acid does **not** contain any α-hydrogen atom.

(1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

90. Which of the following compound turn black on adding NH_4OH to it?

(1) Hg_2Cl_2
(2) AgCl
(3) $ZnSO_4$
(4) $CuSO_4$

91. The **correct** statement(s) about Cr^{2+} and Mn^{3+} is/are;

(1) Mn^{3+} is an oxidizing agent
(2) Cr^{2+} is a reducing agent
(3) Both Cr^{2+} and Mn^{3+} exhibit d^4 electronic configuration
(4) All of these

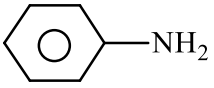
92. Bond energy of H–H bond is 90 kJ/mol, I–I bond is 110 kJ/mol and for H–I bond is 220 kJ/mole the Δ_rH of the reaction $H_2(g) + I_2(g) \rightarrow 2HI(g)$ will be;

(1) –220 kJ/mol (2) –240 kJ/mol
(3) + 100 kJ/mol (4) +120 kJ/mol

93. Which of the following statements is **incorrect**?

(1) At equilibrium, $\Delta G^o = 0$
(2) For spontaneous process, ΔG must be negative
(3) $\Delta G^o = -2.303\ RT \log Kp$
(4) $\Delta G = \Delta G^o + RT \ln(Q)$

94. An amine reacts with $PhSO_2Cl$ and the product obtains is insoluble in alkali, amine is;

(1) $(CH_3)_3N$
(2) CH_3NHCH_3
(3) $CH_3CH_2NH_2$
(4) 

95. The total number of acidic amino acids found in human proteins;

(1) 1 (2) 2
(3) 3 (4) 4

96. Which of the following can **not** act as a reducing agent?

(1) HNO_3 (2) $FeSO_4$
(3) $SnCl_2$ (4) H_2S

97. Which of the following is a π–acid ligand?

(1) F^- (2) NH_3
(3) OH^- (4) CO

98. Assuming full decomposition, the volume of CO_2 released at STP on heating 39.4 g of $BaCO_3$ (at. mass of Ba = 137) will be;

(1) 4.48 L (2) 0.84 L
(3) 2.24 L (4) 4.96 L

99. Which of the following, concentration term depend on temperature?

(1) (w/w)% (2) Molality
(3) Mole fraction (4) Molarity

100. Which of the following is a **correct** half cell reduction reaction for chlorine electrode $Pt(s)/Cl_2(g)/Cl^-(aq)$?

(1) $Cl^-(g) \rightarrow \frac{1}{2}Cl_2(g) + e^-$

(2) $\frac{1}{2}Cl_2(g) + e^- \rightarrow Cl^-(aq)$

(3) $\frac{1}{2}Cl_2(g) + e^- \rightarrow Cl^-(g)$

(4) $Cl^-(aq) \rightarrow \frac{1}{2}Cl_2(aq) + e^-$

(BOTANY)

SECTION-A

101. Animal taxonomists have evolved _____ for scientific naming of animals.
(1) International Code for Botanical Nomenclature (ICBN)
(2) International Criteria for Botanical Nomenclature (ICBN)
(3) International Criteria of Zoological Nomenclature (ICZN)
(4) International Code of Zoological Nomenclature (ICZN)

102. Identify the **incorrect** statement w.r.t fungi.
(1) With the exception of yeasts which are unicellular, fungi are filamentous.
(2) Their bodies consist of long, slender thread-like structures called hyphae.
(3) Some hyphae are continuous tubes filled with multinucleated cytoplasm.
(4) Some hyphae have septae or cross walls in their hyphae- these are called coenocytic hyphae.

103. **Assertion (A):** The members of rhodophyceae are commonly called red algae.
Reason (R): There is the predominance of the red pigment, r-phycoerythrin in the body of the members of rhodophyceae.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

104. In bean flowers, the two smallest petals are known as;
(1) standard. (2) wings.
(3) lateral petals. (4) keel.

105. Identify the **correct** statement w.r.t dicot root.
(1) The outermost layer of the cortex is called endodermis.
(2) The walls of the endodermal cells have a deposition of water-impermeable, waxy material lignin.
(3) The parenchymatous cells which lie between the xylem and the phloem are called conjuctive tissue.
(4) All tissues on the outside of the endodermis constitute the stele.

106. Identify the **incorrect** statement.
(1) Reserved materials in prokaryotic cells are stored in the cytoplasm in the form of inclusion bodies.
(2) Inclusion bodies are membraneless.
(3) Gas vacuoles are found in blue green and purple and green photosynthetic bacteria.
(4) Inclusion bodies are bound to the cell membrane in prokaryotes.

107. Identify the following as **true (T)** or **false (F)** statements w.r.t prophase I of meiosis.
A. Bivalent or tetrad is more clearly visible in pachytene phase.
B. Recombination nodules appears in the diplotene phase.
C. Crossing over is an enzyme-mediated process and the enzyme involved is called recombinase.
D. X-shaped structures formed during pachytene phase are called chiasmata.

	A	**B**	**C**	**D**
(1)	T	T	T	T
(2)	T	T	F	F
(3)	T	F	T	F
(4)	F	T	F	T

108. Which of the following is **not** involved in Calvin cycle?
(1) 3-Phosphoglycerate
(2) Oxaloacetate
(3) Ribulose-1,5- bisphosphate
(4) Triose phosphate

109. **Statement I:** The electrons, as they move through the electron transport system, absorb enough energy that are trapped to synthesise ATP.
Statement II: O_2 is the ultimate acceptor of electrons in ETS of mitochondria and it gets oxidised to water.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct, but Statement II is incorrect.
(3) Statement I is incorrect, but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

110. Identify the **incorrect** match.
(1) Ethylene - Initiates flowering in pineapples
(2) Kinetin - Occurs naturally in plants
(3) Gibberellic acids - Hasten maturity period of the plants
(4) Auxins - Prevent fruit and leaf from dropping at early stage

111. **Assertion (A):** Cleistogamous flowers are invariably autogamous.
Reason (R): There is no chance of cross-pollen landing on the stigma in cleistogamous flowers.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

112. Match **List-I** with **List-II** to find out the **correct** option w.r.t sex chromosomes.

List-I		**List-II**	
(I)	Male *Drosophila*	(A)	XY
(II)	Male Birds	(B)	ZZ
(III)	Female *Drosophila*	(C)	XX
(IV)	Female Birds	(D)	ZW

	I	**II**	**III**	**IV**
(1)	A	B	C	D
(2)	C	A	B	D
(3)	C	D	A	B
(4)	A	B	D	C

113. Identify the **incorrectly** matched pair w.r.t genetic code.
(1) UUU – Phenylalanine
(2) UAA – Stop codon
(3) AUG – Methionine
(4) GUG – Glutamic acid

114. Match **List-I** with **List-II** to find out the **correct** option.

List-I		**List-II**	
(I)	*Aspergillus niger*	(A)	Lactic acid
(II)	*Acetobacter aceti*	(B)	Butyric acid
(III)	*Clostridium butylicum*	(C)	Acetic acid
(IV)	*Lactobacillus*	(D)	Citric acid

	I	**II**	**III**	**IV**
(1)	B	A	D	C
(2)	B	A	C	D
(3)	D	A	B	C
(4)	D	C	B	A

115. **Statement I:** Detritivores (e.g., earthworm) break down detritus into smaller particles and this process is called fragmentation.
Statement II: By the process of leaching, water-soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

116. Each trophic level has a certain mass of living material at a particular time called as the _____.
(1) primary productivity
(2) secondary productivity
(3) standing crop
(4) biomass

117. Choose the **correct** example of ecological diversity.
(1) *Rauwolfia vomitoria* growing in different Himalayan ranges with different potency and concentration of the active chemical (reserpine).
(2) Western Ghats have a greater amphibian species diversity than the Eastern Ghats.
(3) India has a greater ecosystem diversity than a Scandinavian country like Norway.
(4) 50,000 genetically different strains of rice in India.

118. Identify the **incorrect** statement from the following.
(1) The living differentiated cells, that have lost the capacity to divide can regain the capacity of division and this phenomenon is called as dedifferentiation.
(2) Formation of meristems such as interfascicular cambium and cork cambium from fully differentiated parenchyma cells is dedifferentiation.
(3) Maturation of the dedifferentiated cells is called as redifferentiation.
(4) The cells derived from root apical and shoot-apical meristems and cambium differentiate and mature to perform specific functions and this phenomenon is called redifferentiation.

119. From the following, identify the number of structures that are present only in the prokaryotic cells.
Centriole, chloroplast, chromoplast, golgi bodies, plasmid, mesosome, ribosome, cell wall, nucleoid, nucleus
(1) 6 (2) 5
(3) 3 (4) 4

120. Identify the **incorrect** statement w.r.t meiosis.
(1) Interkinesis is followed by prophase II.
(2) G_2 phase is followed by prophase I.
(3) During metaphase II, microtubules from opposite poles of the spindle get attached to the kinetochores of sister chromatids.
(4) Anaphase I begins with the simultaneous splitting of the centromere of each chromosome.

121. Splitting of water release protons in the _____ during _____ reaction.
(1) thylakoid lumen; dark
(2) stroma of chloroplast; light
(3) thylakoid lumen; light
(4) stroma of chloroplast; dark

122. From the following, identify the one that is required for alcohol fermentation.
(1) Mitochondria
(2) Oxygen
(3) Pyruvic acid
(4) FAD^+

123. Identify the **incorrect** statement from the following.
(1) The increased growth per unit time is termed as growth rate.
(2) In arithmetic growth, following mitotic cell division, both daughter cells continue to divide.
(3) The simplest expression of arithmetic growth is exemplified by a root elongating at a constant rate.
(4) In the log phase of geometric growth, both the progeny cells following mitotic cell division retain the ability to divide and continue to do so.

124. Match **List-I** with **List-II** to find out the **correct** option.

List-I		**List-II**	
(I)	Outbreeding device	(A)	Self-incompatibility
(II)	Pollen-pistil interaction	(B)	Occurs only in angiosperms
(III)	Emasculation	(C)	A step of artificial hybridization
(IV)	Triple fusion	(D)	Formation of pollen tube from compatible pollen

	I	**II**	**III**	**IV**
(1)	A	D	C	B
(2)	B	A	C	D
(3)	C	A	B	D
(4)	D	A	C	B

125. Identify the **incorrect** statement.
(1) In bacteria, there are three major types of RNAs: mRNA (messenger RNA), tRNA (transfer RNA), and rRNA (ribosomal RNA).
(2) The mRNA provides the template, tRNA brings amino acids and reads the genetic code, and rRNAs play structural and catalytic role during translation.
(3) There are multiple DNA-dependent RNA polymerases that catalyse transcription of different types of RNA in bacteria.
(4) RNA polymerase binds to promoter and initiates transcription.

126. **Assertion (A):** Haemophilia is a sex-linked recessive disease.
Reason (R): The heterozygous female (carrier) for haemophilia can never transmit the disease to sons.
(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true and **Reason (R)** is false.
(4) **Assertion (A)** is false and **Reason (R)** is true.

127. Identify the **incorrectly** matched pair w.r.t population interaction.
(1) Herbivores - Predators of plants
(2) Competition - Visiting flamingoes and resident fishes of South American lakes
(3) Parasites - Not specific to the host
(4) Commensalism - An orchid growing as an epiphyte on a mango branch

128. Read the following statements and choose the **correct** option.
A. Eukaryotic cells possess an organised nucleus with a nuclear envelope.
B. Eukaryotic cells have a variety of complex locomotory and cytoskeletal structures.
C. All eukaryotic cells are identical.
D. Plant and animal cells are different as the later possess cell walls, plastids and a large central vacuole which are absent in the former.
(1) A and B are incorrect
(2) B and D are correct
(3) A and D are correct
(4) C and D are incorrect

129. Chemiosmosis requires all of the following, **except**;
(1) a membrane.
(2) a proton pump.
(3) an electron gradient.
(4) a proton gradient.

130. Identify the number of **correct** statements from the following.
A. Glucose is the favoured substrate for respiration.
B. All fats are usually first converted into glucose before they are used for respiration.
C. If fatty acids were to respire they would first be degraded to acetyl CoA.
D. Glycerol would enter the respiratory pathway after being converted to PGA.
(1) 1 (2) 2
(3) 3 (4) 4

131. **Statement I:** Plants use two abiotic (wind and water) and one biotic (animals) agents to achieve pollination.
Statement II: Majority of plants use abiotic agents for pollination.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

132. Identify the **correct** sequence of steps of Hershey-Chase experiment.
(1) Infection → Blending → Centrifugation
(2) Infection → Centrifugation → Blending
(3) Blending → Infection → Centrifugation
(4) Centrifugation → Blending → Infection

133. Identify the disease caused by aneuploidy due to loss of a chromosome.
(1) Down's syndrome
(2) Turner's syndrome
(3) Klinefelter's Syndrome
(4) Thalassemia

134. The genotype of the individual with B blood group is;
(1) ii. (2) I^AI^B.
(3) I^Bi. (4) I^Ai.

135. Histones are rich in _____ amino acid residues _____.
(1) basic; lysine and arginine
(2) acidic; lysine and arginine
(3) positive; lysine and glutamic acid
(4) negative; lysine and glutamic acid

SECTION-B

136. In pteridophytes, the gametophyte and sporophyte;
(1) are thalloid and differentiated structures, respectively.
(2) are differentiated structures and thalloid, respectively.
(3) both have thalloid bodies.
(4) both have differentiated bodies.

137. The inflorescence in which the main axis continues to grow;
(1) is called cymose inflorescence.
(2) is called racemose inflorescence.
(3) has basipetal succession of flowers.
(4) has flowers borne apically only.

138. Palisade parenchyma cells are present on the;
(1) abaxial surface of the dicot leaves.
(2) adaxial surface of the dicot leaves.
(3) abaxial surface of the monocot leaves.
(4) adaxial surface of the monocot leaves.

139. **Assertion (A):** Mycoplasmas, the smallest cells, are only 0.03 μm in length.
Reason (R): The length of the bacteria can be between 3 to 5 μm.
(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

140. Match **List-I** with **List-II** to find out the **correct** option w.r.t cell cycle.

List-I		**List-II**	
(I)	G_1 phase	(A)	Centriole duplicates
(II)	S phase	(B)	Cell is metabolically active but do not proliferate
(III)	G_0 phase	(C)	Cell is metabolically active and continuously grows
(IV)	M phase	(D)	Most dramatic period

	I	**II**	**III**	**IV**
(1)	B	A	C	D
(2)	C	A	B	D
(3)	A	D	C	B
(4)	A	D	B	C

141. Identify the **incorrect** statement w.r.t Kranz anatomy.

(1) The particularly large cells around the vascular bundles of the C_4 plants are called bundle sheath cells, and the leaves which have such anatomy are said to have 'Kranz' anatomy'.

(2) 'Kranz' means 'wreath' and is a reflection of the arrangement of cells.

(3) Bundle sheath cells are characterised by having a large number of chloroplasts.

(4) The bundle sheath cells form single layer around the vascular bundles.

142. During the process of respiration, ___**A**___ is/are utilised, and ___**B**___ are released as products. Identify **A** and **B**.

(1) A: oxygen and water; B: carbon dioxide and energy

(2) A: oxygen; B: carbon dioxide, water and energy

(3) A: oxygen and energy; B: carbon dioxide and water

(4) A: carbon dioxide; B: oxygen, water and energy

143. Absolute growth rate of a plant is;

(1) comparison of total growth per unit time.

(2) comparison of total growth per unit area.

(3) the growth of the given system per unit time expressed on a common basis.

(4) the growth of the given system per unit area expressed on a common basis.

144. Megasporogenesis is;

(1) the formation of the megaspores from the megaspore mother cell.

(2) the formation of the single functional microspore from the MMC.

(3) the formation of the mature embryo sac from the MMC.

(4) the formation of the pollen grains from the MMC.

145. **Statement I:** Genetics is a branch of biology which deals with principles of inheritance and its practices.

Statement II: Mendel observed that the expression of the characters in the offspring follow no definite pattern in different generations.

(1) Statement I and Statement II both are correct.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Statement I and Statement II both are incorrect.

146. Match **List-I** with **List-II** to find out the **correct** option.

List-I		**List-II**	
(I)	Adenine	(A)	Purine
(II)	Thymine	(B)	Pyrimidine required in RNA synthesis
(III)	Uracil	(C)	Pyrimidine required in DNA synthesis
(IV)	Ribose	(D)	Sugar required in RNA synthesis

	I	**II**	**III**	**IV**
(1)	C	A	B	D
(2)	B	A	C	D
(3)	A	C	B	D
(4)	C	B	A	D

147. **Assertion (A):** The BOD test measures the rate of uptake of oxygen by micro-organisms in a sample of water.

Reason (R): The lesser the BOD of waste water, more is its polluting potential.

(1) Both **Assertion (A)** and **Reason (R)** are true and **Reason (R)** is a correct explanation of **Assertion (A)**.

(2) Both **Assertion (A)** and **Reason (R)** are true but **Reason (R)** is not a correct explanation of **Assertion (A)**.

(3) **Assertion (A)** is true and **Reason (R)** is false.

(4) **Assertion (A)** is false and **Reason (R)** is true.

148. Individuals belonging to the same population;

(1) belong to the same species and reproduce sexually only.

(2) belong to the same species and reproduce asexually only.

(3) belong to the different species and reproduce sexually only.

(4) belong to the same species and reproduce either sexually or asexually.

149. NPP is the remaining biomass or the energy left after;

(1) utilisation of herbivores.

(2) utilisation of secondary consumers.

(3) utilisation of tertiary consumers.

(4) utilisation of producers.

150. **Statement I:** There are less than 20,000 species of ants on earth.

Statement II: There are about 20,000 species of beetles on earth.

(1) Statement I and Statement II both are correct.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Statement I and Statement II both are incorrect.

(ZOOLOGY)

SECTION-A

151. Asthma is due to;
A. inflammation in alveoli.
B. inflammation in trachea.
C. inflammation in bronchi.
D. inflammation in bronchioles.
(1) A and B (2) Only C
(3) C and D (4) Only D

152. Choose the **incorrect** match.

(1)	Serum	Plasma without the clotting factors
(2)	Fibrinogens	Needed for coagulation of blood
(3)	Albumins	Help in osmotic balance
(4)	Lymphocytes	Most abundant cells of the total WBCs

153. Muscle fibres present in blood vessels, stomach and intestine are;
(1) tapering at both ends.
(2) branched.
(3) cylindrical in shape.
(4) striated.

154. Select the **incorrect** pair w.r.t. cells and their functions.
(1) Eosinophils → Increase during allergy
(2) Basophils → Work like mast cells
(3) Neutrophils → Secrete antibodies
(4) Monocytes → Phagocytes

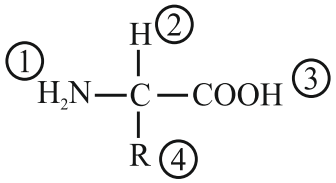
155. Which of the following options **correctly** represents constituents of excretory system of frog?
(1) Kidney, ureter and urinary bladder only
(2) Kidney and urinary bladder only
(3) Kidney, ureters, urinary bladder and cloaca only
(4) Kidney and cloaca only

156. When a neuron is not conducting any impulse, the axonal membrane;
(1) comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions.
(2) equally permeable to both Na^+ and K^+ ions.
(3) impermeable to both Na^+ and K^+ ions.
(4) comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions.

157. Which nephronal segment allows passage of small amounts of urea into the medullary interstitium to maintain the osmolarity?
(1) PCT
(2) DCT
(3) Collecting duct
(4) Henle's loop

158. Read the following statements w.r.t cockroach.
A. Hypopharynx acts as tongue.
B. Antenna have sensory receptors that help in monitoring the environment.
C. Tegmina are transparent, membranous wing and are used in flight.
D. Head is formed by the fusion of six segments.
How many of the given statement/s is/are **correct**?
(1) Four (2) One
(3) Two (4) Three

159. Which of the two groups of following formula are involved in peptide bond formation between successive amino acids?



(1) 2 and 3 (2) 3 and 1
(3) 1 and 4 (4) 4 and 3

160. During and immediately after ventricular systole, which does **not** happens?
(1) Blood get filled in atria from vena cava.
(2) Atrio-ventricular valves get opened.
(3) Semilunar valves get opened.
(4) About 70 ml blood is pumped by each ventricle into large arteries normally.

161. Select the **incorrect** matching.
(1) *Naja* - Cobra
(2) *Bangarus* - Krait
(3) *Vipera* - Viper
(4) *Hemidactylus* - Garden lizard

162. Percentage weight of oxygen, sulphur, magnesium and nitrogen in human body respectively is;
(1) 0.3, 65.0, 3.3 and 0.1
(2) 65.0, 0.3, 0.1 and 3.3
(3) 65.0, 3.3, 46.6 and 0.1
(4) 3.3, 0.1, 0.3 and 65.0

163. Which of the following groups consists exclusively of Cnidarians?
(1) *Aplysia, Gorgonia, Spongilla* and *Hydra*
(2) *Hydra, Pennatula, Obelia* and *Echinus*
(3) *Hydra, Obelia, Adamsia* and *Physalia*
(4) *Scypha, Hydra, Adamsia* and *Physalia*

164. **Statement I:** Filtrate formed by kidney per second is called glomerular filtration rate (GFR).
Statement II: A fall in GFR can activate the JG cells to release renin and stimulate hypothalamus to release ADH from neurohypophysis.
(1) Statement I and Statement II both are correct.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I and Statement II both are incorrect.

165. Choose the most appropriate option which represents function of GnRH.
(1) GnRH stimulates pituitary to release gonadotropin.
(2) GnRH stimulates pituitary for synthesis and release of gonadotropin.
(3) GnRH stimulates testis to release gonadotrophin.
(4) GnRH stimulates hypothalamus to release gonadotrophin.

166. Choose the **incorrect** statement.
(1) Gametogenesis in human females starts at puberty.
(2) Foetal ejection reflex originate from the fully developed foetus and the placenta.
(3) Estrogens are steroid hormones produced by the ovarian follicle.
(4) The third trimester extends from the seventh month till birth.

167. Stimulation of a muscle fibre by a motor neuron occurs at;
(1) neuromuscular junction.
(2) transverse tubules.
(3) myofibril.
(4) sarcoplasmic reticulum.

168. Which of the following is **not** a uricotelic animal?
(1) Pigeon
(2) Toad
(3) Lizard
(4) Cockroach

169. The use of alcohol during adolescence may lead to all **except;**
(1) Heavy drinking in adulthood
(2) Damage to nervous system
(3) Increased masculinisation and increased muscle mass
(4) Liver cirrhosis

170. Choose the **correct** statements given below regarding contraception.
A. Medical Termination of Pregnancy (MTP) during first trimester is generally safe.
B. Generally, chances of conception are nil until mother breast-feeds the infant up to two years.
C. Intra uterine devices like copper-T are effective contraceptives.
D. Contraception pills may be taken upto one week after coitus to prevent pregnancy.
(1) A and C (2) A and B
(3) B and C (4) C and D

171. **Statement I:** Leydig cells are located in interstitial spaces in testes.
Statement II: Leydig cells provide nourishment to developing sperms.
(1) Statement I and Statement II both are correct.
(2) Statement I and Statement II both are incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I is correct but Statement II is incorrect.

172. **Statement I:** Plasmid is a double stranded DNA structure.
Statement II: Plasmid is an extra chromosomal genetic material in bacteria.
(1) Statement I and Statement II both are correct.
(2) Statement I and Statement II both are incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Statement I is correct but Statement II is incorrect.

173. **Statement I:** Cell-mediated immune response is responsible for graft rejection.
Statement II: Tissue matching, blood group matching etc. are required before undertaking any graft.
(1) Statement I is incorrect but Statement II is correct.
(2) Statement I and Statement II both are incorrect.
(3) Statement I and Statement II both are correct.
(4) Statement I is correct but Statement II is incorrect.

174. Who proposed the theory of use and disuse of organs?
(1) Lamarck
(2) Hugo de Vries
(3) Charles Darwin
(4) Alfred Wallace

175. What is the important function of valves in heart?
(1) Encourage backward flow of blood
(2) Change the direction of blood flow
(3) Prevent the backward flow of blood
(4) Pump the blood strongly to further regions of body

176. Identify the part of bird's body which undergoes modification and helps in clasping of tree branches.
(1) Forelimbs
(2) Hindlimbs
(3) Wings
(4) Beak

177. In case of adrenal gland of our body, choose the centrally located tissue and peripherally located tissue.
(1) Adrenal cortex and adrenal medulla, respectively
(2) Adrenal medulla and adrenal cortex, respectively
(3) Pars distalis and pars intermedia, respectively
(4) Pars distalis and pars nervosa respectively.

178. Match **List-I** with **List-II** and choose the **correct** option.

List-I		**List-II**	
(A)	Pill	(I)	Prevents sperms from reaching cervix
(B)	Condom	(II)	Prevents implantation
(C)	Vasectomy	(III)	Prevents ovulation
(D)	Copper T	(IV)	Semen contains no sperms

	A	**B**	**C**	**D**
(1)	III	I	IV	II
(2)	IV	I	II	III
(3)	III	IV	I	II
(4)	II	III	I	IV

179. All of the given diseases are transmitted through contaminated food and water **except;**
(1) Amoebiasis
(2) Ascariasis
(3) Typhoid
(4) Chikungunya

180. Choose the **incorrect** statement.
(1) Colostrum contains several antibodies essential to provide disease resistance to the new-born babies.
(2) The signals for parturition originate from the fully developed foetus and the placenta.
(3) Mammary glands differentiate during pregnancy and secrete milk towards end of pregnancy.
(4) Secondary oocyte is a diploid cell formed as a result of meiosis-II.

181. Choose the most appropriate option that describes elution process of biotechnology.
(1) Separating the restricted DNA fragments on agarose gel.
(2) Staining the separate DNA fragments with ethidium bromide.
(3) Cutting out of the separated band of DNA from the agarose gel and extracting them from the gel piece.
(4) Constructing DNA by joining the purified DNA fragments to the cloning vector.

182. Which of the following ancestors of man lived in near east and central Asia between 1,00,000 to 40,000 years back?
(1) *Australopithecus*
(2) Modern *Homo sapiens*
(3) *Homo erectus*
(4) Neanderthal man

183. Match **List-I** with **List-II** and choose the **correct** option.

List-I		**List-II**	
(A)	Chloramphenicol	(I)	Join the cut ends of DNA molecule
(B)	Ethidium bromide	(II)	Makes bacterial cell competent to take up DNA
(C)	DNA ligase	(III)	Selectable marker
(D)	Calcium	(IV)	Agarose gel staining

	A	**B**	**C**	**D**
(1)	III	IV	II	I
(2)	III	IV	I	II
(3)	IV	III	II	I
(4)	IV	III	I	II

184. Match **List-I** with **List-II** and choose the **correct** option.

List-I		List-II	
(A)	Gout	(I)	Autoimmune disorder affecting neuromuscular junction leading to paralysis of skeletal muscles.
(B)	Osteoporosis	(II)	Progressive degeneration of skeletal muscles mostly due to genetic disorders
(C)	Muscular dystrophy	(III)	Age related disorder characterised by decreased bone mass and increased chances of bone fracture
(D)	Myasthenia gravis	(IV)	Inflammation of joints due to accumulation of uric acid crystals

	A	**B**	**C**	**D**
(1)	I	II	III	IV
(2)	II	III	IV	I
(3)	IV	III	II	I
(4)	III	IV	I	II

185. What limitation of traditional hybridization used for plant and animal breeding has been overcome by the use of rDNA techniques?
(1) High cost.
(2) Insertion of undesirable genes.
(3) Complexity of the procedure.
(4) Antigenicity of the product.

SECTION-B

186. **Statement I:** Internal intercostals and abdominal muscles contract during forceful expiration.
Statement II: During expiration, there is reduction in thoracic volume and pulmonary volume.
(1) Statement I is incorrect but Statement II is correct.
(2) Statement I and Statement II both are incorrect.
(3) Statement I is correct but Statement II is incorrect.
(4) Statement I and Statement II both are correct.

187. **Assertion (A):** Goblet cells are modified columnar cells found in the alimentary canal.
Reason (R): Goblet cells secrete mucus.
(1) **Assertion (A)** is false, and **Reason (R)** is true.
(2) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(3) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(4) **Assertion (A)** is true, and **Reason (R)** is false.

188. **Assertion (A)**: Second heart sound 'Dub' is produced during ventricular systole.
Reason (R): 'Lub' heart sound is produced by closure of AV valves.
(1) **Assertion (A)** is false, and **Reason (R)** is true.
(2) Both **Assertion (A**) and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(3) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(4) **Assertion (A)** is true, and **Reason (R)** is false.

189. Read the following statements.
A. Scapula is situated in the dorsal part of thorax between the second and the seventh ribs.
B. The striated appearance of a myofibril is due to the distribution pattern of sarcoplasmic reticulum.
C. The central hollow portion of vertebra is called neural canal.
D. I-band shortens during muscle contraction.
How many of the above statements is/are **incorrect**?
(1) Two (2) Three
(3) Four (4) One

190. **Assertion (A):** The chemical stored in the synaptic vesicles are termed as neurotransmitters.
Reason (R): Synaptic vesicles release these stored chemicals in the synaptic cleft.
(1) **Assertion (A)** is true, and **Reason (R)** is false.
(2) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(3) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

191. Match **List-I** with **List-II** and choose the **correct** option.

List-I		List-II	
(A)	Flatworms	(I)	Antennal glands
(B)	Aquatic amphibians	(II)	Protonephridia
(C)	Prawns	(III)	Uricotelic
(D)	Land snails	(IV)	Ammonotelic

	A	**B**	**C**	**D**
(1)	II	IV	I	III
(2)	II	III	I	IV
(3)	III	I	II	IV
(4)	II	IV	III	I

192. The following features belong to which class of animal kingdom?

A. Body is divisible into head and trunk, tail may be present in some.
B. Skin is moist and act as respiratory organ.
C. External skeleton is absent.
D. Eyes have eyelids.

(1) Cyclostomata (2) Amphibia
(3) Reptilia (4) Osteichthyes

193. Which of the following acts as an intercellular messenger?

(1) DNA (2) mRNA
(3) Hormone (4) Enzyme

194. **Statement I:** Nerve fibres innervate all cells of the body therefore, cellular functions do not require continuous regulation.
Statement II: The neural coordination is slow but long-lived.

(1) Statement I is incorrect but Statement II is correct.
(2) Statement I and Statement II both are correct.
(3) Statement I is correct but Statement II is incorrect.
(4) Statement I and Statement II both are incorrect.

195. Which statement regarding restriction endonucleases is **not** correct?

(1) They recognize a specific base sequence in the DNA.
(2) They are found in bacterial cells as a primitive immune system.
(3) They digest DNA by removing nucleotides from a free 3' end.
(4) They often generate sticky ends.

196. **Assertion (A):** Lack of menstrual cycle in a fertile female is indicator of pregnancy.
Reason (R): Amenorrhea is observed due to negative feedback exerted by high concentration of progesterone and estrogen secreted from persistent corpus luteum.

(1) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(2) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(3) **Assertion (A)** is true, and **Reason (R)** is false.
(4) **Assertion (A)** is false, and **Reason (R)** is true.

197. **Assertion (A):** Copper-T is an effective contraceptive device in females.
Reason (R): Copper-T prevents passage of sperms from vagina upwards into fallopian tubes.

(1) **Assertion (A)** is false, and **Reason (R)** is true.
(2) Both **Assertion (A)** and **Reason (R)** are true, and **Reason (R)** is a correct explanation of **Assertion (A)**.
(3) Both **Assertion (A)** and **Reason (R)** are true, but **Reason (R)** is not a correct explanation of **Assertion (A)**.
(4) **Assertion (A)** is true, and **Reason (R)** is false.

198. Analyse the symptoms given below.

A. Fluid-filled sacs of the lungs.
B. Fever with chills.
C. Spreads by droplet inhalation.

All of the above mentioned symptoms are shown when an individual has;

(1) Common cold
(2) Pneumonia
(3) Dysentery
(4) Diphtheria

199. In India, the organisation responsible for assessing the safety of introducing genetically modified organisms for public use is;

(1) Research Committee on Genetic Manipulation.
(2) Genetic Engineering Appraisal Committee.
(3) Indian Council of Medical Research.
(4) Genetic Engineering Approval Committee.

200. Match **List-I** with **List-II** and choose the **correct** option.

List-I		**List-II**	
(A)	Louis Pasteur	(I)	Chemical evolution theory
(B)	Early Greek thinkers	(II)	Inheritance of acquired characters
(C)	Oparin and Haladane	(III)	Disapproved spontaneous generation theory
(D)	Lamarck	(IV)	Cosmozoic theory

	A	**B**	**C**	**D**
(1)	III	IV	I	II
(2)	IV	III	II	I
(3)	II	I	III	IV
(4)	I	II	III	IV

■■■

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